

What is claimed is:

1. A liquid crystal display device comprising:

an active matrix substrate comprising an active matrix circuit in which a plurality of pixel TFTs are disposed in a matrix and a source driver, and a gate driver that drive the active matrix circuit; and

an opposing substrate comprising an opposing electrode,

wherein the liquid crystal display device is characterized as:

performing display by optically compensated bend mode, and

conducting voltage gray scale method and time ratio gray scale at the same time by using  $n$  bit out of  $m$  bit digital data as information for voltage gray scale, and  $(m-n)$  bit as information for time ratio gray scale, wherein  $m$  and  $n$  are positive numbers equal to or greater than 2 and satisfy  $m > n$ .

2. A liquid crystal display device comprising:

an active matrix substrate comprising an active matrix circuit in which a plurality of pixel TFTs are disposed in a matrix and a source driver and a gate driver that drive the active matrix circuit; and

an opposing substrate comprising an opposing electrode,

wherein the liquid crystal display device is characterized as:

performing display by optically compensated bend mode, and

conducting voltage gray scale method and time ratio gray scale in this order or time

ratio gray scale immediately after voltage gray scale method by using n bit out of m bit digital data as information for voltage gray scale, and (m-n) bit as information for time ratio gray scale, wherein m and n are positive numbers equal to or greater than 2 and satisfy  $m > n$ .

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3. A liquid crystal display device comprising:

an active matrix substrate comprising an active matrix circuit in which a plurality of pixel TFTs are disposed in a matrix and a source driver and a gate driver that drive the active matrix circuit;

an opposing substrate comprising an opposing electrode; and

10 a circuit which converts m bit digital video data inputted from the external into n bit digital video data and provides the n bit digital video data to the source driver, wherein m and n are positive numbers equal to or greater than 2 and satisfy  $m > n$ ,

wherein the liquid crystal display device is characterized as:

forming an image for one frame image comprising  $2^{m-n}$  subframes by performing  
15 voltage gray scale method and time ratio gray scale at the same time, and;

applying voltage which makes an orientation of liquid crystal to a bend orientation on starting display of the  $2^{m-n}$  subframes.

4. A liquid crystal display device comprising:

20 an active matrix substrate comprising an active matrix circuit in which a plurality of pixel TFTs are disposed in a matrix and a source driver and a gate driver that drive the active matrix circuit;

an opposing substrate comprising an opposing electrode; and

a circuit which converts m bit digital video data inputted from the external into n bit digital video data and provides the n bit digital video data to the source driver, wherein m and n are positive numbers equal to or greater than 2 and satisfy  $m > n$ ,

5 wherein the liquid crystal display device is characterized as:

forming an image for one frame image comprising  $2^{m-n}$  subframes by performing voltage gray scale method and time ratio gray scale in this order, performing voltage gray scale method after time ratio gray scale, or one immediately after the other;

applying voltage which makes an orientation of liquid crystal to a bend orientation on starting display of the  $2^{m-n}$  subframes.

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5. ~~A liquid crystal display device comprising:~~

an active matrix substrate comprising an active matrix circuit in which a plurality of pixel TFTs are disposed in a matrix and a source driver and a gate driver that drive the active matrix circuit;

15 an opposing substrate which comprises an opposing electrode; and

a circuit which converts m bit digital video data inputted from the external into n bit digital video data and provides the n bit digital video data to the source driver, wherein m and n are positive numbers equal to or greater than 2 and satisfy  $m > n$ ,

wherein the liquid crystal display device is characterized as:

20 forming an image for one frame image comprising  $2^{m-n}$  subframes by performing voltage gray scale method and time ratio gray scale at the same time;

applying voltage which makes an orientation of liquid crystal to a bend orientation on starting display of the frame which comprises  $2^{m-n}$  subframes.

6. A liquid crystal display device comprising:

an active matrix substrate comprising an active matrix circuit in which a plurality of pixel TFTs are disposed in a matrix and a source driver and a gate driver that drive the active matrix circuit;

an opposing substrate comprising an opposing electrode; and

a circuit which converts  $m$  bit digital video data inputted from the external into  $n$  bit digital video data and provides the  $n$  bit digital video data to the source driver, wherein  $m$  and  $n$  are positive numbers equal to or greater than 2 and satisfy  $m > n$ ,

wherein the liquid crystal display device is characterized as:

forming an image for one frame image comprising  $2^{m-n}$  subframes by performing voltage gray scale method and time ratio gray scale in this order, performing voltage gray scale method after time ratio gray scale, or one immediately after the other;

applying voltage which makes an orientation of liquid crystal to a bend orientation on starting display of the frame which comprises  $2^{m-n}$  subframes.

7. A liquid crystal display device according to claim 1, wherein the positive number  $m$  is 10 and the positive number  $n$  is 2.

8. A liquid crystal display device according to claim 2, wherein the positive number  $m$  is 10 and the positive number  $n$  is 2.

9. A liquid crystal display device according to claim 3, wherein the positive number

m is 10 and the positive number n is 2.

10. A liquid crystal display device according to claim 4, wherein the positive number m is 10 and the positive number n is 2.

5 11. A liquid crystal display device according to claim 5, wherein the positive number m is 10 and the positive number n is 2.

12. A liquid crystal display device according to claim 6, wherein the positive number m is 10 and the positive number n is 2.

13. A liquid crystal display device according to claim 1, wherein the positive number m is 12 and the positive number n is 4.

10 14. A liquid crystal display device according to claim 2, wherein the positive number m is 12 and the positive number n is 4.

15. A liquid crystal display device according to claim 3, wherein the positive number m is 12 and the positive number n is 4.

15 16. A liquid crystal display device according to claim 4, wherein the positive number m is 12 and the positive number n is 4.

17. A liquid crystal display device according to claim 5, wherein the positive number m is 12 and the positive number n is 4.

18. A liquid crystal display device according to claim 6, wherein the positive number m is 12 and the positive number n is 4.

20 19. A rear projector which comprises 3 liquid crystal display devices according to claim 1.

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20. A rear projector which comprises 3 liquid crystal display devices according to claim 2.

21. A rear projector which comprises 3 liquid crystal display devices according to claim 3.

5 22. A rear projector which comprises 3 liquid crystal display devices according to claim 4.

23. A rear projector which comprises 3 liquid crystal display devices according to claim 5.

10 24. A rear projector which comprises 3 liquid crystal display devices according to claim 6.

25. A front projector which comprises 3 liquid crystal display devices according to claim 1.

26. A front projector which comprises 3 liquid crystal display devices according to claim 2.

15 27. A front projector which comprises 3 liquid crystal display devices according to claim 3.

28. A front projector which comprises 3 liquid crystal display devices according to claim 4.

20 29. A front projector which comprises 3 liquid crystal display devices according to claim 5.

30. A front projector which comprises 3 liquid crystal display devices according to

claim 6.

31. A single plate type projector which comprises a liquid crystal display device according to claim 1.

5 32. A single plate type projector which comprises a liquid crystal display device according to claim 2.

33. A single plate type projector which comprises a liquid crystal display device according to claim 3.

34. A single plate type projector which comprises a liquid crystal display device according to claim 4.

10 35. A single plate type projector which comprises a liquid crystal display device according to claim 5.

36. A single plate type projector which comprises a liquid crystal display device according to claim 6.

15 37. A goggle type display which comprises 2 liquid crystal display devices according to claim 1.

38. A goggle type display which comprises 2 liquid crystal display devices according to claim 2.

39. A goggle type display which comprises 2 liquid crystal display devices according to claim 3.

20 40. A goggle type display which comprises 2 liquid crystal display devices according to claim 4.

41. A goggle type display which comprises 2 liquid crystal display devices according to claim 5.

42. A goggle type display which comprises 2 liquid crystal display devices according to claim 6.

5 43. A portable information terminal which comprises a liquid crystal display device according to claim 1.

44. A portable information terminal which comprises a liquid crystal display device according to claim 2.

10 45. A portable information terminal which comprises a liquid crystal display device according to claim 3.

46. A portable information terminal which comprises a liquid crystal display device according to claim 4.

47. A portable information terminal which comprises a liquid crystal display device according to claim 5.

15 48. A portable information terminal which comprises a liquid crystal display device according to claim 6.

49. A notebook type personal computer which comprises a liquid crystal display device according to claim 1.

20 50. A notebook type personal computer which comprises a liquid crystal display device according to claim 2.

51. A notebook type personal computer which comprises a liquid crystal display



device according to claim 3.

52. A notebook type personal computer which comprises a liquid crystal display device according to claim 4.

53. A notebook type personal computer which comprises a liquid crystal display device according to claim 5.

54. A notebook type personal computer which comprises a liquid crystal display device according to claim 6.

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